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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants: HIROI et al

Serial No.: 10/062,666

Filed: February 5, 2002

For: Pattern Inspection Method And System Therefor

Group: 2881

Examiner: J. Berman

Conf. No.: 4688

APPEAL BRIEF

Mail Stop: Patent Appeals (Fee)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

November 30, 2009

Sir:

This Appeal Brief is being submitted under 37 CFR 41.37 in connection with the appeal of the above-identified application, a Notice of Appeal having been filed on September 30, 2009.

(i) REAL PARTY IN INTEREST

The real party in interest is Hitachi, Ltd. of Japan.

(ii) RELATED APPEALS AND INTERFERENCES

On information and belief, appellant is unaware of any prior and pending

appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

(iii) STATUS OF CLAIMS

Claims 1, 2, 4, 7 - 9 and 17 - 19 have been canceled with claims 3, 5, 6, 10 - 16 and 20 - 37 being rejected and on appeal.

(iv) STATUS OF AMENDMENTS

An Amendment After Final Rejection was filed on September 30, 2009. The Amendments filed September 30, 2009 have been entered for purposes of appeal, and a copy of claims 3, 5, 6, 10 - 16 and 20 - 37, which are on appeal, appear in the Claim Appendix attached hereto.

(v) SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to a method for displaying a defect candidate image on a screen together with display on the same screen of defect candidate data which is displayed in a map format. Appellants note that in the following, page and line numbers of the specification refer to the Substitute Specification submitted April 2, 2002.

Independent claim 5, one of the independent claims on appeal, recites a defect candidate image displaying method as illustrated in Figs. 4 and 8 of the drawings, for example, wherein as shown in Fig. 4, a charged particle beam or

light beam from a beam source 1 is irradiated onto a surface of a target substrate 5, which may in the form of a wafer 31, as illustrated in Fig. 7, and having a pattern formed thereon, as described in the paragraph bridging pages 3 and 4 of the substitute specification. As described, a detector 8 detects secondary electrons 7 emitted from the target substrate 5 and, an A/D converter 9 converts a detected signal from analog to digital to form a digital image. Claim 5 recites the feature of producing an image of the substrate surface by detecting any of a reflected light, secondary electron, reflected electron, transmitted electron, or absorbed electron generated from the substrate as a result of irradiation and producing a digital image by subjecting the produced image signal to A/D conversion, which conversion is obtained by way of the A/D converter 9. After the conversion, as illustrated in Fig. 4 and described at page 4, lines 7 - 13 of the substitute specification, an image processing circuit 110 compares the digital image against a digital image that can be expected to be substantially identical, i.e., a reference image, and detects a difference in the images at a location as a pattern defect 11. Claim 5 recites the feature of comparing the digital image with a reference image and extracting defect candidates, which are represented by the pattern defects 11. Further, claim 5 recites the features of outputting actual images of the extracted defect candidates and data comprising the location of the defect candidates, via either a storage medium or a network, storing the outputted actual images of the extracted defect candidates and data comprising the location of the defect candidates, and displaying on a screen in a map format, the defect candidates location data outputted via either the storage medium or network. As

described at page 4, lines 11 - 22, of the substitute specification, defect data storing means 201 operates to store defect data 200 comprising the defect location and image data of the pattern defects 11, and data output means 203 outputs the stored defect data 202 to either a network or a storage medium. An inputting means 205 is provided for inputting defect data 202 related to a plurality of wafers, which was outputted to data transferring means 204 by data outputting means 203, and defect data storing means 206 stores the inputted defect data. A defect map 207 operates to display defect location data of the wafer on a display screen, and applicants note that Fig. 8 shows in the map display portion 55 of the screen, display in a map format of the defect candidate location data which is outputted via the storage medium or network on the screen. In Fig. 4, there is illustrated an image display means 209 whereas Fig. 8 generally illustrates a display screen having a map display portion 55 and an adjacent image display portion 56, wherein the map display portion 55 corresponds to defect map 207 of Fig. 4, and the image display portion 56 corresponds to image displaying means 209 of Fig. 4. As recited in claim 5, the method includes displaying on the screen a selected one of the stored actual images of the extracted defect candidates which is designated on the screen among the extracted defect candidates data displayed in the map format on the screen so that the selected one of the stored actual images is displayed together with the map format on the screen, without revisiting the substrate surface and the designated defect candidates of the substrate surface to produce an actual image of the designated defect candidate of the substrate surfaces. That is, as shown in Fig. 8, defect candidate location is

represented in the map display portion 55 by circles and rectangles representing location of a defect on the wafer map, and as described in the paragraph bridging pages 13 and 14 of the substitute specification, an image of a defect specified from among the defects displayed on the map display portion 55 is displayed on image display portion 56. As described, specifying a defect for displaying of this image is effected by operating a mouse operation command button 142, selecting a selection mode 145 from among a selection mode 145 and a zooming mode 146 and moving the current location symbol or cursor 59 with the mouse to a desired position over a candidate data location, a location of the defect to be viewed so that the image of the defect selected is displayed on the image display portion 56, of the screen simultaneously with the defect candidate location data displayed on the image display portion 56 of the screen. Although not illustrated in Fig. 8, an actual image of the defect at the location of the symbol 59 at a defect location displayed on the map display portion 55, which actual image is stored and retrieved from storage, is then displayed in the image display portion 56, so that the selected one of the stored actual images corresponding to the image for the location at which the symbol or cursor 59 on the map format display 56 is displayed together with the display of map format on the screen simultaneously.

Independent Claim 6, another independent claim on appeal recites a defect candidate image displaying method comprising the steps of detecting defect candidates of a pattern by using a inspecting means, which as illustrated in Figs. 1 and 7 of the drawings is obtained by the electron optical system 34 which is utilized for applying an electron beam to the substrate or wafer 31 and detecting a

secondary electron 7 emitted therefrom by way of the detector 8, wherein after conversion by the A/D converter 9, the image processing circuit 110 outputs actual images of the detected defect candidates and data including location information of the defect candidates, as described at pages 11 and 12 of the specification. The outputted defect candidate actual images and date including location information of the defect candidates is stored in a memory, as recited in claim 6, as represented by the data storage means 201 and 202. As shown in Fig. 8, stored defect candidates data is displayed on a map portion 55 of a screen in a map format, and as described, by locating a current location symbol 59, as illustrated in Fig. 8 over one of the defect candidates, and continuing the operations as described, an actual image of the stored defect candidate as selected which is designated on the screen among the defect candidates data displayed in the map form and the screen is displayed together with the map format on the image display portion 56 of the screen of the display, without revising the substrate surface and the designated defect candidate of the substrate to produce an actual image of the designated defect candidate of the substrate surfaces.

Independent Claim 16, another of the independent claims on appeal, also recites the feature of a defect candidate image displaying method including the steps of imaging a substrate on which a pattern is formed as obtained by the electron optical system 64 as shown in Fig. 7 and processing an image obtained by the imaging to detect defect candidates of the pattern as obtained by the image processing circuit 110. Claim 16 recites the feature of outputting actual images of

the detected defect candidates and data including location information of the defect candidate while carrying out the step of imaging the substrate and the step of detecting defect candidates of the pattern, as described at pages 11 and 12 of the specification. Claim 16 further recites storing the outputted actual images of the detected defect candidates and data including location information of the defect candidates in a memory, as represented by the defect data storage means 201, and as described in connection with Fig. 8 simultaneously displaying, on a screen, having map display portion 55 and image display portion 56, the actual defect candidate image, which is selected by locating and clicking on the current location symbol 59 on a defect candidate displayed in map form in the map display portion 55 while the actual image is displayed in image display portion 56, without revisiting the substrate surface and the designated defect candidates of the substrate surface to produce an actual image of the designated defect candidate of the substrate surfaces.

Dependent Claims

With respect to the dependent claims, dependent claims 3, 25, 26, 31, 32 and 35 depend from independent claim 5, wherein claim 3, which is an original claim of the application, and has been amended to depend from claim 5, recites the feature that the information outputted at the outputting step includes data enabling the classification of the defect. Applicants note that Fig. 5 shows the frequency of different defects and may be considered to illustrate classification, for example. Claims 25 and 26 recite the feature that the map format is displayed at one portion of the screen, as represented by the map display portion 55 in Fig. 8,

and that the displayed actual image of the defect candidate is simultaneously displayed at another portion of the screen as represented by the image display portion 56, although Fig. 8 does not illustrate the actual image being displayed. Claim 26 recites the feature that the one portion and the another portion of the screen are adjacent portions of the screen, as illustrated in Fig. 8.

Claim 31 recites the feature that the step of displaying on the screen include displaying the defect candidate location data of the extracted defect candidates in the map format which was outputted and stored and the selected actual image of the extracted defect candidate which was outputted and stored. Claim 32 recites the feature that one system performs at least the steps of irradiating, producing an image of the substrate surface, producing a digital image, comparing, outputting actual images of the extracted defect candidates and data comprising the location of the defect candidates for storage and display so as to enable display of the location of the extracted defect candidates data in map format and the selected actual image of the extracted defect candidate outputted by the one system. Claim 35 recites the feature that the step of displaying on the screen in the map format the defect candidates location data outputted via either storage medium or network includes displaying defect candidates location data in said map format with a selected magnification of a variable magnification on the screen together with the selected one of the stored actual images, as described at page 14, lines 2 - 5 of the Substitute Specification, when enlargement or reduction is obtained by the zooming mode 146 of Fig. 8.

As to the dependent claims which depend from independent claim 6, which

include claims 10 - 15, 27, 28, 33 and 36, claims 10 - 15 represent original claims amended to recite the feature of the defect candidate image displaying method and reciting further features of the present invention. Thus, claim 10, an original claim, representing part of the original application and disclosure, as filed, recites the step of changing threshold value data on the screen, when detecting defect candidates of the pattern using the inspecting means and claim 11 recites the feature that the defect candidates location data display in map format is updated and displayed in accordance with the change threshold value data. Claim 12 recites the step that the defect candidates are classified using the images of defect candidates outputted via either the storage means or network and data comprising the locations of these defect candidates and location data of these classified defect candidates is identified by classification and displayed in map format on the screen. Claim 13 is similar to claim 12 while reciting the feature that the location data of the designated defect candidate from among these classified defect candidates is displayed in map format on the screen. Claim 14 depends from claim 13 and recites the feature that location data of defect candidates of a plurality of classifications designated from among the classified defect candidates is identified by the classifications and displayed in map format on the screen and claim 15 depends from claim 13 and recites further comprising the steps of processing the outputted actual images of the defect candidates and data comprising location of the defect candidates by the processing means, and thereafter, outputting via the network. Dependent claims 27 and 28 recite features as recited in claims 25 and 26 concerning the feature that the map format and the

actual displayed image of the defect candidate are simultaneously displayed at positions adjacent one another on the screen, as represented on the screen as represented by the adjacent map display portion 55 and image display portion 56, as illustrated in Fig. 8. Claim 33 corresponds to the features of claim 32, described above, and claim 36 corresponds to the features of claim 35 as described above, which features are described at page 14, lines 2- 5 of the Substitute Specification.

With regard to the dependent claims, which depend from independent claim 16, such dependent claims include claims 20 - 24, 29, 30, 33 and 37, wherein claims 20 - 24 represent original claims of the application as filed and represent part of the original disclosure with such claims being amended to recite the defect candidate image displaying method. Claim 20 recites the step of changing threshold value data for detecting defect candidates of the pattern on the screen with dependent claim 21 which depends from claim 20 reciting the feature that the location of the defect candidates displayed in map format is updated and displayed in accordance with the change threshold value data. Claim 22 recites the feature that in the step of displaying on the screen, the defect candidates are classified using the actual images of defect candidates and data including location information of the defect candidate outputted via either the storage medium and network and identically classified defect candidates are displayed in map format on the screen. Claim 23 recites the feature that in the step of displaying on the screen, the defect candidates are classified using the actual images of defect candidates and data including location information of the

defect candidates outputted via either the storage medium or network, and defect candidate location data designated from among the classified defect candidates is displayed in map format on the screen. Claim 24 recites the feature that plural classes of defect candidates from among the classified defect candidates are displayed on the screen discriminately from each other in the map format. Claims 29 and 30 correspond to claims 25 and 26 and 27, 28, as discussed above, and recite the feature that the map format is displayed at one portion of the screen and the displayed actual image is simultaneously displayed at another portion of the screen which portions are adjacent one another as illustrated in Fig. 8. Claim 34 corresponds to the features of claims 32 and 33, as described above. Further, claim 37 recites the feature that in the step of simultaneous displaying, displaying the defect candidates data of location information in the map format with a selected magnification on the screen together with the selected actual defect candidate image, as described at page 14, lines 2- 5 of the Substitute Specification.

(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 3, 5, 6, 12 - 16 and 25 - 37 stand rejected under 35 USC 103(a) as being unpatentable over Mizuno (US Patent No. 6,047,083) in view of Worster et al (US Patent No. 5,963,314).

Claims 10, 11 and 20 - 24 stand rejected under 35 USC 103(a) as being unpatentable over Mizuno and Worster et al in view of Gallarda et al (US Patent No. 6,539,106).

(vii) ARGUMENTS

Appellants submit that each of independent claims 5, 6 and 16 recite a defect candidate image displaying method, wherein actual images of defect candidates are obtained in addition to location data for such images and the defect candidate location data is displayed on a screen in a map format and additionally, a selected one of the actual images of the stored defect candidate which is designated on the screen among the defect candidate data displayed in the map format on the screen is displayed together or simultaneously with the display of the map format on the screen. Irrespective of the contentions by the Examiner, such features are not disclosed or taught in the cited art.

Turning to Mizuno, Fig. 6A of Mizuno discloses displaying on a screen in a map format, defect candidate location data as represented by the specified points or dots shown in the chips of the wafer. Moreover, Mizuno in Figs. 2A - 2D may be considered to disclose detection of defects, and Figs. 2A - 2D may be considered to represent actual images of such defects.

Appellants note that Mizuno at column 6, lines 32 - 44 provide:

> The means used for classifying the types and sizes of the defects is, for example, of a hardware configuration such as shown in portion A of Fig. 1. In other words, the elements shown in portion A carry out the above-described steps (12) and (13) of Fig. 3 (detailed in Figs. 4 and 5). (emphasis added).

In accordance with the disclosure of Mizuno, defects are classified in accordance with steps (12) and (13) of Fig. 3, wherein an SEM image for inspection is formed, as indicated in step (10) and a comparison is effected between the SEM image for

inspection and a reference image, so as to detect a differing portion, as indicated in step (11), as also shown in Fig. 4. Based upon this detected differing portion or defect, a classification is effected, which classification is represented by the symbol as shown in the right-hand portion of Fig. 6B of Mizuno, wherein as shown in the left-hand portion of Fig. 6B, the symbol is super imposed on the defect location, as a symbol representing the type of defect. Applicants submit that it is readily apparent that the symbols  ; the symbols  or  , or  ; or other symbols utilized while being representative of a type of defect, are not disclosed or taught to be "actual images of the extracted defect candidates", (emphasis added), such that Mizuno, does not disclose or teach, irrespective of the Examiner's contentions, the recited features of independent claims 5, 6 and 16, that in addition to displaying in a screen in a map format, location data of defect candidates, a selected one of the actual images of the stored defect candidates which is designated on the screen among the defect candidate displayed in the map format on the screen, is displayed together or simultaneously on the screen. Appellants submit that Mizuno provides no disclosure or teaching of the aforementioned features, as recited in the independent and dependent claims of this application.

Apparently, the Examiner has accepted the fact that Mizuno does not disclose or teach the aforementioned features. Thus, the Examiner in the Office Action dated February 14, 2008, contends that "Such a teaching is found in Worster et al at line 29 in column 13 through line 44 in column

14 and illustrated in FIG. 4 ... so that an operator can select a stored image of a defect to display by using, for example, a mouse to "point" and "click" on a defect indicated in the wafer map." (emphasis added). Applicants submit that the Examiner has mischaracterized the disclosure of Worster et al and that the contention of the Examiner that "it would have been obvious to a person having ordinary skill in the art to display a selected one of the stored actual images of the extracted defect candidates which is designated on the screen among the extracted defect candidate data displayed in said map format on said screen so that the selected one of the stored actual images is displayed together with said map format on said screen in the manner taught by Worster et al in order to make use of the point and click system control method disclosed by Worster et al or to aid an operator in relating the image of a defect to its actual location on the wafer" (emphasis added) is again a mischaracterization of the disclosure of Worster et al, as will be discussed below.

Irrespective of the Examiner's contention, applicants submit that Worster et al does not disclose or teach the recited feature of each of independent claims 5, 6 and 16 of "storing said outputted actual image of ... defect candidate" of the substrate surface or the pattern, and simultaneously displaying with the defect candidate data of location information displayed in a map format on the screen a "selected one of the stored actual images of the detected defect candidates" of the substrate surface or the pattern, as previously presented. Moreover, by the present

amendment, in accordance with the present invention, since the stored actual image of the defect candidate is displayed based upon the stored actual image, the display is effected without revisiting the substrate surface or the pattern and the designated defect candidate of the substrate surface or the pattern to produce an actual image of the designated defect of the substrate surface or the pattern, as now recited in the independent claims in order to clarify the differences with respect to Worster et al.

Contrary to the position set forth by the Examiner, Worster et al provides no disclosure or teaching of storing actual images of defects of a wafer and displaying a stored actual image together with defects shown in a map format on a screen. In accordance with Worster et al, a laser imaging system 100 is utilized for imaging the wafer, and as indicated in column 14, lines 4 - 6, "The Laser Window directly displays the live laser image produced by the scanning laser beam." (emphasis added). Further, as recognized by the Examiner, and as described in column 14, lines 36 - 39, "The Wafer Map Window displays the defect map of the wafer under inspection, the defect map having produced by a wafer scanner that is not part of laser imaging system 100 ... The operator can select a defect to revisit by, for instance, using a mouse to "point and click" on the defect. (emphasis added). Applicants submit that when a defect is selected in this manner, in accordance with the disclosure and teaching of Worster, that selected portion of the wafer is newly scanned by the laser beam so as to directly display the live laser image produced by the scanning laser beam

with appropriate control of the focus and range of the laser. Applicants submit that there is no disclosure or teaching in Worster et al of storing an actual image of the defect and displaying the stored actual image together with the map format of the defects, as recited in the independent claims of this application. Thus, applicants submit the Examiner has misinterpreted the meaning of "revisit" as representing obtaining a stored actual image, and it is apparent that the revisiting requires a revisiting of the wafer and the defect thereof so as to then produce an actual image of the defect. The independent claims 5, 6 and 16 recite the feature of "without revisiting said substrate surface and the designated defect candidate of said substrate surface to produce an actual image of the designated defect candidate of said substrate surface" (emphasis added), and applicants submit that such features are not disclosed by Worster et al, and in light of the recognition by the Examiner that Mizuno does not disclose such features, the proposed combination also fails to provide the recited features of the independent and dependent claims of this application, even though the Examiner contends at page 4 in the Office Action dated April 30, 2009, that "it is true that Mizuno does not teach to display one of the stored images at the same time that the wafer map is displayed. Worster et al was cited for the teaching that such a display of a wafer map and images corresponding to locations on the wafer map at the same time is useful. (emphasis added). Irrespective of Worster et al's useful teaching, appellants submit that the claims of the present invention on appeal are METHOD claims reciting

specific features of a method which provide for display of a stored actual image of a designated defect candidate simultaneously with a wafer map without revisiting the substrate surface which is a requirement of Worster et al. Thus, appellants submit that the combination of Mizuno and Worster et al fail to disclose or teach the recited features of the independent and dependent claims, on appeal, and all claims should be considered allowable thereover.

With regard to the dependent claims, appellants note that such dependent claims further define features of the present invention, which when considered in conjunction with independent claims 5, 6 and 16, further patentably distinguish over the cited art. In fact, the Examiner has recognized that the features of dependent claims 35 - 37, are not disclosed in Mizuno and/or Worster et al. That is, in the portion of the paragraph bridging pages 3 and 4 of the Office Action dated September 9, 2008, regarding the features of magnification, as recited in claims 35 - 38, the Examiner states:

> In this regard, while neither Mizuno nor Worster et al disclose such a feature, it is well known in the art of maps to vary the magnification of maps in order to balance the ability to show a larger area of the geography portrayed by the map, which requires a smaller amount of magnification and the ability to pinpoint a particular location on that geography, which requires a larger amount of magnification. Such variable magnification in maps is routinely seen in, for example, road atlases which have maps illustrating roads and countries, states, and selected cities. It is rare to find a map on line that does not have a zoom feature that allows an operator to select magnification of the map. It would therefore been obvious to a person having ordinary skill in the art to display the wafer map produced by the Mizuno apparatus at a selected magnification of a variable magnification, as is claimed in new claims 35 - 37. (emphasis added).

Appellants submit that hereagain, the issue is not whether the Examiner can reconstruct the method of the present invention from the prior art, but whether, the method, as recited in the claims is rendered obvious by the teachings of Mizuno and Worster et al, as contended by the Examiner. Appellants submit that as recognized by the Examiner, the features of the independent claims and likewise, the dependent claims, are not disclosed or taught by such cited art, and all claims should be considered allowable thereover.

With respect to the addition of Gallarda, whether or not Gallarda may be considered to disclose utilizing different thresholds for defect detection, appellants submit that Gallarda, like Mizuno and Worster et al, provides no disclosure or teaching of displaying a screen defect candidate location data in a map format and, additionally displaying on the screen, a selected one of actual images of defect candidates which is designated on the screen among the defect candidates data displayed in the map format on the screen, so that the map format and the actual image of the designated defect candidate are displayed together, i.e., simultaneously on the same screen, as recited in independent claims 5, 6 and 16 of this application. Thus, appellants submit that the combination of Mizuno, Worster et al and Gallarda taken alone or in any combination thereof, fail to provide the recited features of the independent claims 5, 6 and 16 and therewith the dependent claims of this application.

With respect the dependent claims, the dependent claims recite further features concerning the manner of detection and classification and display of the recited information on the screen. While the Examiner refers to various features

being found in the cited art, as pointed out above, the dependent claims further define features of the independent claims, which features of the independent claims are not disclosed or taught by the cited art taken individually or in any combination thereof. Whether or not the Examiner could modify any of the cited art to provide a defect candidate image display, as recited in the claims of this application, appellants submit there is no disclosure or teaching of the recited features in the art applied in rejecting claims of this application.

CONCLUSION

For the foregoing reasons, appellants request that the Examiner's rejections be reversed.

The Appeal Brief fee was submitted with the Appeal Brief filed April 10, 2007.

Please charge any shortage in the fees due in connection with the filing of this paper, including additional Appeal Brief fees and extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, Deposit Account No. 01-2135 (Case: 501.41125X00), and please credit any excess fees to said deposit account.

Respectfully submitted,

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(viii) CLAIM APPENDIX

3. The defect candidate image displaying method according to Claim 5, wherein said information outputted at the outputting step includes data enabling the classification of the defect.

5. A defect candidate image displaying method, comprising the steps of:

irradiating either a charged particle or a light on a surface of a substrate on which a pattern is formed;

producing an image of said substrate surface by detecting any of a reflected light, secondary electron, reflected electron, transmitted electron, or absorbed electron generated from said substrate as a result of the irradiation;

producing a digital image by subjecting the produced image signal to A/D conversion;

comparing the digital image with a reference image and extracting defect candidates of said substrate surface;

outputting actual images of the extracted defect candidates of said substrate surface and data including the location of the defect candidates of said substrate surface, via either a storage medium or a network;

storing said outputted actual images of the extracted defect candidates of said substrate surface and data including the location of the defect candidates;

displaying on a screen in a map format the defect candidates location data outputted via either said storage medium or network; and

displaying on said screen a selected one of the stored actual images of the extracted defect candidates of said substrate surface which is designated on said

screen among the extracted defect candidates data displayed in said map format on said screen so that the selected one of the stored actual images of the extracted defect candidates of said substrate surface is displayed together with said map format on said screen without revisiting said substrate surface and the designated defect candidate of said substrate surface to produce an actual image of the designated defect candidate of said substrate surface.

6. A defect candidate image displaying method, comprising the steps of:

detecting defect candidates of a pattern by using an inspecting means;

outputting actual images of the detected defect candidates of the pattern and data including location information of the defect candidates;

storing said outputted actual images of the defect candidates of the pattern and data including location information of the defect candidates of the pattern in a memory;

displaying the stored defect candidates data on a screen in map format; and

displaying on said screen a selected one of the actual images of the stored defect candidates of the pattern stored in said memory which is designated on said screen among the defect candidates data displayed in said map format on said screen so that the selected one of the stored actual images of the defect candidates of the pattern is displayed together with said map format on said screen without revisiting the pattern and the designated defect candidate of the pattern to produce an actual image of the designated defect candidate of the pattern.

10. The defect candidate image displaying method according to Claim 6, further comprising the step of changing threshold value data on said screen, when detecting defect candidates of said pattern using said inspecting means.

11. The defect candidate image displaying method according to Claim 10, wherein defect candidates location data displayed in map format is updated and displayed in accordance with said changed threshold value data.

12. The defect candidate image displaying method according to Claim 6, wherein, in said step for displaying on said screen, said defect candidates are classified using the actual images of defect candidates outputted via either said storage medium or network and data comprising the locations of the defect candidates, and location data of the classified defect candidates is identified by classification and displayed in map format on said screen.

13. The defect candidate image displaying method according to Claim 6, wherein, in said step for displaying on said screen, said defect candidates are classified using the actual images of defect candidates outputted via either said storage medium or network and data comprising the locations of the defect candidates, and location data of the designated defect candidate from among the classified defect candidates is displayed in map format on said screen.

14. The defect candidate image displaying method according to Claim 13, wherein location data of defect candidates of a plurality of classifications designated from among said classified defect candidates is identified by said classifications and displayed in map format on said screen.

15. The defect candidate image displaying method according to Claim 13, further comprising the steps of processing said outputted actual images of said defect candidates and data comprising the location of the defect candidates by said processing means, and thereafter outputting via said network.

16. A defect candidate image displaying method, comprising the steps of:

imaging a substrate on which a pattern is formed;

processing an image obtained by said imaging to detect defect candidates of said pattern;

outputting actual images of said detected defect candidates of said pattern and data including location information of the defect candidates of said pattern via a network while carrying out the step of imaging said substrate and the step of detecting defect candidates of said pattern;

storing said outputted actual images of said detected defect candidates of said pattern and data including location information of the defect candidates in a memory; and

simultaneously displaying, on a screen, one of said stored actual images of said defect candidates and data including the location information of the defect candidates stored in said memory;

wherein, in the step of simultaneously displaying, said defect candidates data of location information is displayed in a map format on said screen and said one of said stored actual images of defect candidates which is simultaneously displayed on said screen is a selected one of the stored actual images of the detected defect candidates of said pattern stored in said memory, which is

designated on said screen among the defect candidates data displayed in said map format on said screen without revisiting said pattern and the designated defect candidate of said pattern to produce an actual image of the designated defect of said pattern.

20. The defect candidate image displaying method according to Claim 16, further comprising the step of changing threshold value data for detecting defect candidates of said pattern on said screen.

21. The defect candidate image displaying method according to Claim 20, wherein the location of the defect candidates displayed in map format is updated and displayed in accordance with said changed threshold value data.

22. The defect candidate image displaying method according to Claim 16, wherein, in the step of displaying on said screen, said defect candidates are classified using the actual images of defect candidates and data including location information of the defect candidates outputted via either said storage medium or network, and identically classified defect candidates are displayed in map format on said screen.

23. The defect candidate image displaying method according to Claim 16, wherein, in the step of displaying on said screen, said defect candidates are classified using the actual images of defect candidates and data including location information of the defect candidates outputted via either said storage medium or network, and defect candidate location data designated from among the classified defect candidates is displayed in map format on said screen.

24. The defect candidate image displaying method according to Claim 23, wherein plural classes of defect candidates designated from among said classified defect candidates are displayed on said screen discriminately from each other in the map format.

25. The defect candidate image displaying method according to claim 5, wherein said map format is displayed at one portion of said screen and said displayed actual image of the designated defect candidate is simultaneously displayed at another portion of said screen.

26. The defect candidate image displaying method according to claim 25, wherein the one portion and the another portion of said screen are adjacent portions of said screen.

27. The defect candidate image displaying method according to claim 6, wherein said map format and said actual displayed image of the designated defect candidate are simultaneously displayed at positions adjacent one another on said screen.

28. The defect candidate image displaying method according to claim 27, wherein the one portion and the another portion of said screen are adjacent portions of said screen.

29. The defect candidate image displaying method according to claim 16, wherein said map format and said actual displayed image of the designated

defect candidate are simultaneously displayed at positions adjacent one another on said screen.

30. The defect candidate image displaying method according to claim 29, wherein the one portion and the another portion of said screen are adjacent portions of said screen.

31. The defect candidate image displaying method according to claim 5, wherein the step of displaying on the screen includes displaying the defect candidate location data of the extracted defect candidates in the map format which was outputted and stored and the selected actual image of the extracted defect candidate which was outputted and stored.

32. The defect candidate image displaying method according to claim 5, wherein one system performs at least the steps of irradiating, producing an image of said substrate surface, producing a digital image, comparing, outputting actual images of the extracted defect candidates and data comprising the location of the defect candidates for storage and display so as to enable display of the location of the extracted defect candidates data in map format and the selected actual image of the extracted defect candidate outputted by the one system.

33. The defect candidate image displaying method according to claim 6, wherein one system performs at least the steps of detecting defect candidates of a pattern by using an inspecting means and outputting an actual images of the detected defect candidates and data including location information of the defect candidates for storage and display so as to enable display of the location of the

defect candidates data in map format and the selected actual image of the defect candidate outputted by the one system.

34. The defect candidate image displaying method according to claim 16, wherein one system performs at least the steps of imaging a substrate on which a pattern is formed, processing an image obtained by said imaging to detect defect candidates of said pattern, and outputting actual images of said detected defect candidates and data including location information of the defect candidates via a network while carrying out the step of imaging said substrate and the step of detecting defect candidates of said pattern for storage and display so as to enable display of the location of the defect candidates data in map format and the selected actual image of the defect candidate outputted by the one system.

35. The defect candidate image displaying method according to claim 5, wherein the step of displaying on said screen in said map format the defect candidate candidates location data outputted via either said storage medium or network includes displaying the defect candidates location data in said map format with a selected magnification of a variable magnification on said screen together with the selected one of the stored actual images.

36. The defect candidate image displaying method according to claim 6, wherein said step of displaying the stored candidates data on said screen in map format includes displaying the stored defect candidates data in map format with a selected magnification of a variable magnification on said screen together with the selected one of the store actual images .

37. The defect candidate image displaying method according to claim 16, wherein, in the step of simultaneous displaying, displaying said defect candidates data of location information in said map format with a selected magnification of a variable magnification on said screen together with said selected actual defect candidate image.

(ix) EVIDENCE APPENDIX

None

(x) RELATED PROCEEDINGS APPENDIX

None